PROPERTY TAX POLICY AND HOUSING AFFORDABILITY

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Abstract

We examine property tax reduction as a tool for increasing housing affordability. Analyzing various tax reduction policies through the lens of property tax incidence reveals a complex relationship between affordability and property taxes, with differential effects across demographic groups. Many policies often fail to improve affordability for young first-time homebuyers and renters, sometimes worsening affordability. We present a new nationwide atlas documenting the prevalence of local measures altering property tax burdens. Quasi-experimental evidence from Georgia's homestead exemption valuation freezes suggests strong capitalization of assessment limits into home values, reinforcing that property tax relief may worsen affordability for first-time buyers.

KEYWORDS: property tax, incidence, housing affordability, assessment limits, homestead exemption.

JEL classifications: H22, H71, R21, R31, R38

1. INTRODUCTION

The U.S. is widely perceived to be suffering from an acute housing affordability crisis (e.g., Dougherty, 2024, Friedman, 2024). Indeed, housing has been consuming a growing share of household resources. The proportion of renters spending more than 30 percent of income on housing has risen steadily from 20 percent in 1960 to around 45 percent in 2022, and the lack of affordability is particularly acute among the young, as they are more prone to being cost-burdened than older cohorts (Council of Economic Advisors, 2024). Moreover, the rate of homeownership for the young has fallen more steeply than for older households in recent years (Fry and Brown, 2016).

While economists often point to a lack of housing supply as the key factor in the affordability crisis (e.g., Ben-Shahar et al., 2020), politicians often see property tax cuts as a promising avenue for immediately increasing affordability, and policymakers have been considering and enacting various reforms to reduce property tax burdens. For instance, Texas recently enacted a large property tax reduction by both lowering rates and increasing exemptions (Washington, 2023). Such efforts naturally raise the question: is reducing property tax burdens an effective mechanism for improving housing affordability?

There are a number of reasons why property tax reductions may appear to be a promising avenue for addressing housing affordability. Property tax collections are large – equal to

around 3 percent of personal income nationally – and are an important component of housing costs. Moreover, in contrast to many possible housing market reforms, property taxes are a policy lever which can be quickly enacted and take effect nearly immediately. In addition, property taxes tend to be very salient (Cabral and Hoxby, 2012). Policymakers may consider this salience useful because it increases the odds that voters will perceive them as working to improve housing affordability when they provide property tax relief.

Yet, the theoretical and empirical evidence paints a murkier picture. In particular, interrogating who bears the incidence of the tax raises questions over the efficacy of at least some forms of property tax reduction for achieving affordability and also highlights that the gains in affordability may vary sharply across demographic groups. A classic debate in public finance centers on the extent to which property taxes are capitalized into home values (Oates and Fischel, 2016). If property taxes do capitalize, a blanket reduction in property tax burdens will render housing more affordable for current homeowners both by increasing lifetime resources through the boost to property values and by providing liquidity in the form of lower annual tax payments. But the tax cut will be ineffective at increasing affordability on the margin of homeownership. That is, such tax cuts will fail to provide assistance to prospective first-time homeowners – a demographic frequently identified as suffering from the most acute affordability problems.

Moreover, since local governments across the U.S. heavily rely on the property tax to finance public goods and services, particularly K-12 education, tax cuts can result in second-order effects on local economies and housing markets. Some theories of the property tax emphasize that houses, in addition to providing shelter, are a method for purchasing a future stream of local public goods such as schooling. If a tax cut is paired with a corresponding cut to public services and those services are valued by homeowners, then the tax cut will only provide a narrow improvement in housing affordability and may fail to improve the overall welfare of homeowners.

This paper examines the connections between property tax policy changes and housing affordability. Despite the importance of the topic given the current affordability crisis, as well as synergies with the existing corpus of research on the property tax, the recent

economics literature lacks studies exploring any explicit connection between housing affordability and property taxes.[1]

We begin with a brief overview of trends in housing affordability in the U.S. Property taxes do not appear to be a cause of the nationwide erosion in affordability, as they have fallen to nearly a forty-year low as a share of personal income. Next, we summarize our understanding of property tax incidence – that is, who fundamentally bears the burden of the tax after accounting for market adjustments to the tax. We then analyze how various policy-driven changes to property tax burdens are likely to affect housing affordability through the lens of the economic incidence of the property tax. In particular, we examine four property tax relief measures that have been considered and implemented by state and local governments in recent years, including directly reducing effective tax rates – either by rate reductions, rate limits, or levy limits – increasing homestead exemptions, imposing assessment limits or freezes, and using impact fees on new development and/or user fees earmarked for specific local public goods as alternative revenue sources.

Four lessons emerge. First, the connection between housing affordability and property tax relief measures is complex and difficult to concisely summarize. Relief measures tend to benefit certain groups, and the extent to which different groups benefit is a function of factors such as the strength of capitalization into house prices and the tendency of tax changes to pass through into rents. Policymakers should not simply assume that pushing down property tax burdens will generate a broad increase in housing affordability. Second, first-time homebuyers and renters are among the groups least likely to benefit from the relief measures and often see affordability decrease. First-time buyers and renters are typically younger, lower-income, and more racially diverse than existing homeowners benefiting from the policies. Accordingly, the policies can be viewed as often failing to achieve affordability in an equitable manner. Third, if property tax relief measures are to be used towards improving housing affordability, levy and rate limits appear to be relatively desirable options given that they distort housing markets less than the other mechanisms. Fourth, if property tax relief measures require cuts to public goods spending and these

[1] A notable exception is Reschovsky (2023), who provides aggregate summary statistics on property tax burdens in the U.S.

public goods are fully valued by residents, then any increase in affordability is narrow in scope and may produce welfare losses, as residents consume less public goods.

We then turn to providing two new sets of empirical evidence. First, we present empirical measures of the level and distribution of effective property tax burdens at the state level and how relief measures influence these burdens. Although this evidence is insufficient to fully establish the connection between property taxes and affordability – e.g., due to factors like capitalization – it is a natural starting point. Tax relief measures will not influence affordability if they do not first alter measured tax burdens.

We use the CoreLogic database, which is derived primarily from administrative public records on home sales transactions, property tax bills, and building permits. This allows us to measure effective property tax rates (tax liabilities as a percent of home market value) for nearly the universe of homes that sell in the United States. We produce an atlas summarizing characteristics of state property tax systems — including the overall property tax level, the difference in property tax burdens between owner-occupied and investment properties, the difference in property tax burdens on new vs. existing owners resulting from assessment limits, and the level of impact fees levied on new building projects. These measures summarize the combined effect of all state and local property tax policies on the effective property tax rate faced by homeowners.[2]

Estimated effective property tax rates vary widely across states, from a low of 0.5% of home value in Hawaii to a high of 2.6% of home value in Vermont. Effective tax rates are highest in New England and the Midwest, as well as Texas. We find that Michigan and Vermont offer owner-occupied properties the largest property tax benefits over investment properties. In these states, effective tax rates on owner-occupied homes are roughly half a percentage point lower than on other homes in the same Census tract. We also estimate the wedge between new and existing owners' effective tax rates in three large states with

[2]We contribute to the literature on state property tax systems by producing estimates of effective tax rates using parcel-level, administrative data. The Lincoln Institute of Land Policy and Minnesota Center for Fiscal Excellence publish an annual atlas of effective property tax rates by city using data on statutory property tax features (rates, exemptions, credits, and assessment ratios), supplemented with estimates of how assessed values differ from market values (Lincoln Institute of Land Policy and Minnesota Center for Fiscal Excellence, 2024). The Tax Foundation publishes estimates of effective property tax rates by state using estimates of median home values and median tax bills from American Community Survey data (Yushkov, 2023).

assessment growth limits – California, Florida, and Michigan. We find that for the median sale in each of these states, the new owner's effective tax rate is at least 0.3 percentage points higher than the prior owner's effective tax rate.

Turning to our second empirical exercise, we provide new causal evidence on the connection between property tax changes and affordability. We study the staggered passage of property tax assessment freezes extended to homeowners claiming homestead exemptions in Georgia. Between 1999 and 2008, 33 Georgia counties passed, by ballot, local statutes either freezing tax-assessed values at a base year or capping any assessed value increase at a statutory inflation rate indexed to recent annual house price growth.

Using modern difference-in-differences estimators comparing the evolution of house prices in counties that enacted an assessment freeze to those that did not (Sun and Abraham, 2021, Callaway and Sant'Anna, 2021), we find that the average freeze event leads to an immediate jump in local house prices of 3 percent. This effect is robust to accounting for time-varying (lagged) municipal balance sheet conditions, including counties' debt-to-income ratios and their reliance on property tax revenues. Average treatment effects on treated counties follow a hump shape, peaking two years since freeze passage and then decaying towards zero nine years after passage. We show that the impermanence of this effect is due to strategic behavior in counties' tax decisions, whereby neighboring counties either compete for mobile tax bases (Wilson, 1986) or engage in non-base yardstick competition (Revelli and Tovmo, 2007). After controlling for the spatial autocorrelation in counties' homestead exemption policies, we uncover more muted, but still sizeable, effects on house prices.

Unlike previous studies relying on correlations between effective tax rates (ETRs) and prices of ambiguous interpretation, we have access to a clear shock resulting in lower effective tax rates for at least some owner-occupiers in a county. Further, Georgia is a large state (the 8th most populous according to the 2020 Census) and is divided into 159 counties. This is useful for identification, because we can subset our data to compare jurisdictions with (plausibly) exogenously higher or lower ETRs, while avoiding an obvious selection problem of treated counties being more urban and/or in a more secure financial position that allows them to offer tax breaks relative to their neighbors.

Our finding that assessment limits capitalize into housing values reinforces several of the conclusions from our tax incidence-based analysis of the connection between property tax

decreases and housing affordability. In particular, assessment limits convey no immediate benefits upon new homeowners; they only convey a future, expected benefit which is realized to the extent the home appreciates. The lack of an immediate benefit, and the uncertainty over the ultimate benefit, renders assessment limits less likely to capitalize than other forms of property tax relief. That we document that they nevertheless do capitalize reinforces the importance of capitalization and the overall complexity of the connection between property tax changes and housing affordability. It also reinforces the message that first-time homebuyers are not helped by many tax relief measures. In fact, under capitalization, first-time homebuyers see affordability worsen with assessment limits due to increased immediate liquidity needs. In the initial years of ownership, first-time buyers must service a larger mortgage to cover the capitalization, but receive no offsetting benefit from the limit. And, if tax rates must be raised to cover the revenue cost of the assessment limits, they are further disadvantaged in terms of affordability.

2. BACKGROUND

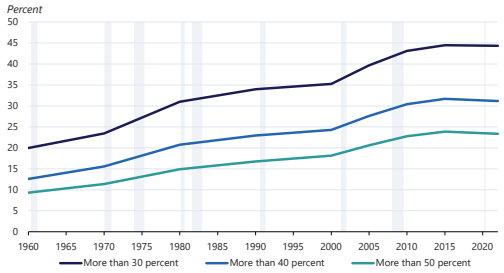
2.1. *Housing Affordability*

Housing has gradually grown less affordable over time in the U.S., as it is consuming an ever-growing share of household resources. One commonly used, albeit highly imperfect, measure of housing unaffordability is the share of households who spend in excess of 30 percent of their income on rent (Joint Center for Housing Studies, 2018). As can be seen in panel A of Figure 1, the share of such “cost-burdened" households has grown from 20 percent in 1960 to nearly 45 percent in 2022. And the share of households spending 50 percent or more has risen from under 10 percent to almost 25 percent. Moreover, for those looking to enter homeownership, house price growth has been rapidly outstripping wage growth in recent years, as documented in panel B of Figure 1.

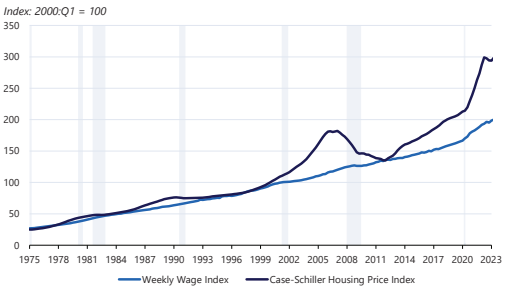
One hypothesis for the increasing expenditure share of housing is that as incomes rise, families may prefer to spend a higher share of annual resources on housing. That is, the Engel curve for housing may be upward sloping. However, the increasing expenditure share for housing reflects rising *costs*, not an increase in the quality or quantity of housing consumed (Albouy et al., 2023). Moreover, research has documented a host of negative consequences for both households and metro areas arising from a lack affordable housing — see Gabriel and Painter (2020) for discussion and a more complete set of citations.

FIGURE 1.—Trends in Measures of U.S. Housing Affordability

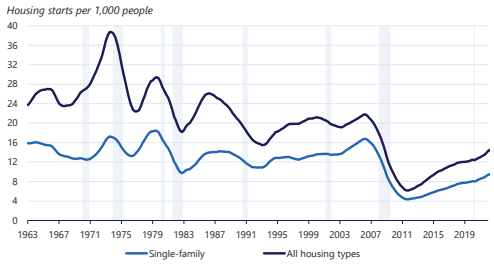
A. Share of Renters Cost Burdened, 1960–2022



B. Housing Price Index versus Wage Index, 1975–2023



C. Housing Production, 1963–2022



D. Property Taxes as Share of Income, 1980–2023

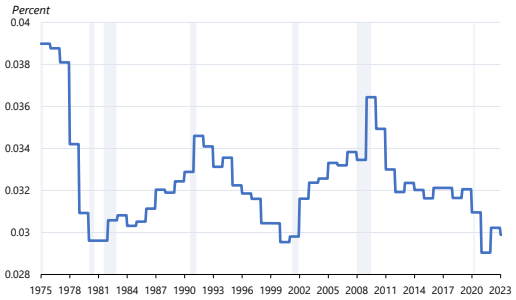


FIGURE 1.—Gray bars indicate NBER recessions. Panels A, B, and C are reproduced from Council of Economic Advisors (2024). Panel A sources: Census Bureau (American Community Survey). Note: The data for years after 2000 are averaged in 5-year bins. Panel B sources: Bureau of Labor Statistics (Quarterly Census of Employment and Wages). Weekly Wage Index has been smoothed using a 4-quarter moving average. Panel C sources: Census Bureau; CEA calculations. The quarterly data are smoothed using a 3-year moving average. Panel D source: Bureau of Economic Analysis; property tax collections on real property, NIPA Table 3.5, line 38; personal income, NIPA Table 2.1, line 1.

The proximate cause of the affordability crisis is a pronounced shortfall in housing unit production relative to rates of new household formation, which has produced over time a large deficit of housing relative to the population (Council of Economic Advisors, 2024). The slowdown in housing production can be seen on panel C of Figure 1. The recent literature on housing affordability has identified several reasons for the shortfall in housing supply, with restrictive zoning and land use regulation often singled out as a principal cause and the availability of land and labor sometimes also cited (e.g., Gyourko and Molloy, 2015, Glaeser and Gyourko, 2018, Molloy, 2020, Khater et al., 2021).

In principal, property taxes are a possible contributor to growing housing unaffordability. In practice, though, this appears not to be the case, at least at the aggregate level. As shown in panel D of Figure 1, despite the surge in housing costs, property taxes as a share of personal income have been sliding since shortly after the Global Financial Crisis and currently stand at near a forty-year low.[3]

2.2. *Incidence of the Property Tax*

The efficacy of attempts by policymakers to influence housing affordability through reductions in property taxes rests crucially on the economic incidence of the tax. Unfortunately, our understanding of this incidence is in a "sad state" (Oates and Fischel, 2016). In particular, theoretical analyses of property tax incidence in the public finance literature have long centered on two very stylized theories with starkly different implications for incidence: the "benefit view" and the "capital tax view."[4]

The benefit view combines the canonical Tiebout (1956) model – under which individuals optimize over local public good bundles by choosing where to reside – with land use regulations such as zoning. Regulations fix the supply of housing in a community such that any difference in property tax obligations and the value of the associated bundle of public goods capitalizes into housing prices. This capitalization equalizes the cost and benefit of public goods and converts the property tax into a user charge for public goods.

The capital tax view takes a general equilibrium perspective and emphasizes two distinct effects of the tax. First, the average level of taxation in an economy serves as a tax on capital, with the incidence falling on the owners of the fixed capital stock. Second, differences around the average tax level create an "excise tax" effect; capital is assumed to be mobile across jurisdictions, and the burden of this part of the tax accrues to immobile factors such as land and relatively immobile factors such as workers and renters.

[3] Although the principal focus of this paper is the property tax, it is important to note that other local government revenue sources, such as user fees, may also influence housing affordability. As shown in Shadbegian (1999), as property tax revenue was pushed down by state-level legislated constraints in the 1970s and 1980s, non-tax revenue, such as user fees, increased.

[4] Fischel (2001), Nechyba (2001), Zodrow (2001), and Oates and Fischel (2016) provide reviews of the debate and contain citations to the relevant literature.

The two theories have different implications for using property tax reductions as a tool for increasing housing affordability. Under the benefit view, a key consideration is to what extent the tax reduction is paired with a reduction in public goods. For instance, if a broad reduction in tax rates is financed by reducing public goods fully valued by the marginal homebuyer, the reduction in tax burden will not be capitalized. And while the annual liquidity requirements of homeownership will be reduced – thus making housing more affordable in a narrow sense – it is less clear that housing has been rendered more affordable once adjusting for the quality of local public goods provision.

In contrast, under the capital tax view, a tax reduction will lower the “excise tax" in the jurisdiction and induce mobile housing capital to enter the jurisdiction until the tax-inclusive return on capital is driven down to the economy-wide market-clearing level. The benefit of the tax reduction accrues to the immobile factors in the jurisdiction. In some circumstances, housing affordability could be viewed as having been improved, for instance, if locally-owned land and labor are immobile factors in the jurisdiction, then residents will benefit as land rents and wages are bid up.

These frameworks highlight important aspects of property tax incidence. But they are highly abridged models of reality and embed assumptions that fail to hold in practice — e.g., zoning does not perfectly fix the supply of housing everywhere in the U.S., and the capital stock of housing is not fixed over any reasonable time horizon. Moreover, the frameworks generally fail to provide sharp, contrasting empirical predictions to test their relative validity.[5]

As discussed in Oates and Fischel (2016) and formalized in Löffler and Siegloch (2021), both views have valid elements and varying relevance in different locations. A key factor mediating the relevance of each in a given location is the elasticity of housing supply.[6] The more inelastic is housing supply, the relatively more likely a tax reduction is to capitalize and the more relevant the insights of the benefit view are. In contrast, the more elastic is

[5] A large literature documents that property tax changes often capitalize into housing values—e.g., Oates (1969), Hoyt et al. (2011). However, although it is more emphasized in the benefit view, capitalization can occur under both frameworks and generally fails to distinguish between them (e.g., Zodrow, 2001, Oates and Fischel, 2016).

[6] See, for instance, Saiz (2010), Glaeser and Gyourko (2018), Baum-Snow and Han (2024) for a discussion of housing supply elasticity.

housing supply, the more likely is a tax reduction to spur increased housing investment and the relatively more important are the insights of the capital tax view. Recent empirical evidence supports this synthesized view of property tax incidence, showing that property tax changes induce both capitalization and housing construction responses, with the relative importance of these margins of adjustment mediated importantly by the elasticity of housing supply (Hilber and Mayer, 2009, Lutz, 2015, Löffler and Siegloch, 2021).

Although the incidence of the property tax remains an unsettled issue, the discussion here provides at least two key insights into how property tax reductions are likely to influence housing affordability. First, the analysis must carefully consider the potential for both a capitalization and housing supply response and that the relative magnitudes of these responses are likely a function of a jurisdiction's housing supply elasticity. Second, the analysis must consider if the tax reduction is associated with a reduction in local public goods provision.

3. RECENT POLICY PROPOSALS ON REDUCING PROPERTY TAX BURDENS

Property taxes in the U.S. are overwhelmingly collected and used by local governments. The most straightforward method for a tax cut is for localities to simply cut rates. There is also a long history of state governments intervening in various ways to reduce the burden of the tax. For example, all but four states restrict property taxation through at least one state-level limit on the growth of tax rates, levies, or assessment.[7] Moreover, states employee a battery of other property tax relief policies including tax exemptions and tax credits, with benefit levels often determined by household characteristics such as age and income (Lincoln Institute of Land Policy, 2024).

The enactment of property tax relief measures peaked in 1970s during the so-called "property tax revolt" and is best exemplified by California's Proposition 13. The property tax revolt occurred during an era of high inflation and rapid house price appreciation. Across the country, policymakers implemented new property tax limitation regimes, or, in states with direct democracy provisions, voters took the initiative on their own.

[7] Such limits have a long history in the U.S., dating back to the 1800s, with a majority of states having some form of limit in place by 1950. Paquin (2015) provides the most recent cataloguing of such restrictions, as well as a thorough history of their use. Walczak (2018) provides a detailed overview of the types of limits.

Today, against the backdrop of several years of high inflation, significant property valuation increases, and the ongoing housing affordability crisis, many states are again considering expansions of property tax relief measures.[8] For example, Colorado and Montana are exploring ways to limit property tax burdens (Schaefer, 2024). On the more extreme side, Florida, Nebraska, and Michigan are considering outright elimination of the tax (Farmer, 2024, Walczak and Bhatt, 2024). Idaho and Texas have recently enacted new limits, with Texas increasing deductions and lowering tax rates (Hardy, 2024). Some observers are predicting that we are entering another era of revolt against the property tax (e.g Schaefer, 2024), although it is far too soon to know this with any certainty.

While states put their own distinct marks on property tax relief measures, a broad taxonomy is possible, and we consider four policies:

1. Levy and rate limits which broadly constrain property tax collections at the *jurisdiction* level. We also consider locally-implemented rate cuts in this grouping, as they all operate through a broad-based reduction in effective tax rates.[9]
2. Assessment limits which constrain collections at the level of the individual property as a function of the *tenure of ownership*.
3. Homestead exemptions which reduce collections at the level of the individual *homeowner*.[10]
4. Impact fees for new construction and the related concept of user fees which can be used in lieu of property taxes to finance local public goods.

Each of these policies have different advantages and disadvantages in terms of increasing affordability, particularly with regard to their effects on particular groups such as first-time homebuyers and low-income residents; they also introduce varying levels of distortions to the housing market. Below, we examine these four policies in turn.

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[8] Housing values rose extraordinarily quickly during the pandemic, spiking 43 percent between March 2020 and June 2022 according to the Case-Shiller U.S. National Home Price Index – almost 25 percentage points higher than inflation as measured using the BLS CPI-U.

[9] Bradley et al. (2023) produces a property tax simulation that highlights how different levy and rate limits interact.

[10] In our typology of relief policies, circuit breakers – which limit collections at the level of the homeowner when they exceed a certain percentage of their income – can be viewed as akin to a homestead deduction targeted based on income.

3.1. *Broad Reductions in Effective Tax Rates: Rate Reductions, Levy Limits, and Rate Limits*

We consider three ways in which a broad reduction in jurisdiction-level effective tax rates can be achieved. Local governments can simply lower tax rates.[11] Alternatively, state governments can impose either rate limits or levy limits. Under levy limits, property tax millages are automatically rolled back to prevent overall collections from those properties from exceeding an established growth factor. Rate limits, in contrast, simply cap millages.[12]

When tax burdens are reduced by these methods, affordability for existing homeowners is increased through two primary channels: liquidity and wealth (or lifetime resources). For liquidity constrained consumers—often estimated to be a large share of U.S. households (e.g., Boar et al., 2021)—the reduction in annual property tax payments frees cash flow for non-housing uses, and thereby renders housing more affordable. For non-liquidity constrained households (e.g. canonical permanent income consumers) lifetime resources increase, allowing for increased non-housing consumption. If the tax shock does not capitalize into housing values, then the boost to lifetime resources is equal to the present discounted value (PDV) of the future stream of tax payments over the duration the household expects to remain in the house. If the shock capitalizes, then the increase in wealth is larger and equal to the PDV of the stream of reduced tax payments in perpetuity.

The connection between rate cuts, rate limits, and levy limits is more nuanced for first-time homebuyers. If the shock does not capitalize, then, like existing homeowners, they receive a wealth or liquidity boost, and housing becomes more affordable. However, if the shock capitalizes, then they receive neither a boost to liquidity nor to lifetime resources. For instance, a liquidity constrained household will have lower cash flow needs for tax

[11] Local governments routinely adjust tax rates in response to changes in housing values. When housing appreciates, local policymakers tend to adjust tax rates down in order to partially blunt the increase in revenue (Lutz, 2008, Lutz et al., 2011).

[12] While rate limits can be a significant policy constraint, they do not necessarily curtail growth in property tax burdens if home values are rising. In the discussion here, we assume that the rate limits bind in the sense that they reduce revenue relative to a counterfactual in which the limit was not in place.

payments, but will have offsetting higher cash flow needs to service the larger mortgage required by the increase in house prices.[13]

The extent of the capitalization of a tax reduction is a crucial variable in assessing the tax cut's influence on housing affordability. Two key factors determine the extent of capitalization: public goods provision and housing supply elasticities.

Property tax cuts caused by tax limitations often cause a decline in the provision of local public goods such as K-12 schooling (e.g., Poterba and Rueben, 1995, Dye and McGuire, 1997, Downes and Figlio, 1999). If property tax reductions are funded via a cut in public services *and* those services are fully valued by the marginal homebuyer, then no capitalization will occur; the boost to housing value from the reduced stream of future tax payments is perfectly offset by the decline in home value caused by the reduced future flow of public services. Thus, the efficiency of public goods provision plays an important role in determining how property tax cuts influence housing affordability.[14]

The elasticity of housing supply varies significantly across metro areas (e.g., Saiz, 2010, Gorback and Keys, 2023) and within metro areas (Baum-Snow and Han, 2024). This is an active area of research, and contributing to it is well beyond the scope of this paper. That said, the guidance offered in Oates and Fischel (2016), based on an extrapolation of the results in Lutz (2015), that urbanized areas containing around 80 percent of the U.S. population are likely to exhibit sufficiently inelastic housing supply to generate important levels of capitalization seems broadly correct. But capitalization will be imperfect in many places, and conclusions regarding housing affordability and tax reductions must be modified accordingly. And there is likely little capitalization in rural areas, particularly over

[13] On net, these offsetting forces are likely to *reduce* housing affordability for new homebuyers under full capitalization, as the boost to housing prices is equal to the PDV of the stream of tax payments in perpetuity, whereas the reduction in annual tax payments will only be experienced over the tenure in the home. Accordingly, in PDV terms, the increase in house price will exceed the value of the annual tax reductions (Slack and Tassonyi, 2022). Coven et al. (2024) formalize such mechanisms in a quantitative overlapping generations model with downpayment constraints to show that broad increases in property tax rates for high-rate states like California would reallocate ownership to younger households.

[14] Brueckner (1979, 1982, 1983) presents a classic bid-rent model in which efficient public goods provision is equal to the level that maximizes aggregate property value. Using this framework, Barrow and Rouse (2004) empirically demonstrate that U.S. households tend to fully value K-12 education services, the primary use of the property tax.

a time horizon long enough for building to respond to tax changes and thereby arbitrage away tax benefits.

The discussion so far has ignored renters. While landlords pay the tax, and therefore bear the legal incidence, the economic incidence may be shifted onto renters in the form of higher rents. If the tax is fully shifted onto renters, then the connection between housing affordability and property tax reductions from levy and rate limits is much the same as for homeowners, with renters in the role of existing homeowners. On the other hand, if the tax is fully borne by landlords, then it will fail to improve affordability for renters. The degree of shifting is a function of demand and supply elasticities in the rental housing market and is an unsettled issue in the empirical literature (see Carroll and Yinger, 1994, Tsoodle and Turner, 2008, England, 2016). A degree of shifting is likely in most cases.

3.2. *Assessment Limits*

Assessment limits are intended to constrain increases in tax burdens driven by rising home values. These limits cap increases in taxable assessed value, with a home's value only being reassessed at market rates when a triggering event occurs—such as a change in ownership or an addition or improvement. Thus, assessment limits effectively abate tax burdens at the level of an individual house as a function of the owner's tenure (or other factors such as age).

By lowering annual tax payments, assessment limits provide substantial benefits to incumbent homeowners. California's Proposition 13, ratified in 1978, set a 1975 base year for valuations and limited annual assessment growth to the lesser of 2 percent or California CPI-U. If a person acquired a home in 1975 and sold it to an unrelated party in 2023, the new owner's property tax burden would be more than *nine* times what the prior owner paid, because the property would reset to market value.[15] Accordingly, for long-tenured owners, assessment limits can greatly increase housing affordability. But they do so at

[15]This calculation sets the acquisition price by year from the Federal Housing Finance Agency's All-Transactions House Price Index for a home in Los Angeles worth $1 million in 2023. We then apply the limits imposed by Proposition 13 (the lesser of California CPI-U or 2%) for each year to obtain a property tax bill of $902 for an owner with acquisition year in 1975 compared to the new owner's bill in 2023 of $8,200.

the expense of eroding affordability for less-tenured households and introducing housing market inefficiencies.

In order to finance a given level of public goods, assessment limits require a jurisdiction to have a higher tax rate than in the absence of the limit. Through this channel, the cost of the assessment limit is, in part, shifted onto those with less tenure – a group likely to be younger than those with long tenure. Homeowners with short tenures include first-time homebuyers and many residents who will have fewer financial resources than established owners who receive preferential treatment. Hence, assessment limits widen intergenerational wealth inequality.

Assessment limits also create lock-in effects, whereby existing homeowners face strong tax incentives to remain in their current home to continue receiving a tax abatement, even if it might otherwise make sense for them to move (Wasi and White, 2005). The limits therefore tend to impede mutually beneficial market reallocation of housing space. For instance, an elderly couple may wish to downsize, and in a market without assessment limits, would sell to a younger family residing in the same community wishing to move into a larger home.

A remedy to such lock-in effects is to allow "portability" of assessment limits – i.e., allow homeowners to transfer their favorable assessment to another property. California even confers inheritability, allowing children and grandchildren to assume the sub-market rate assessed value of the deceased grantor if the home becomes their primary residence (Ca. Const. art. XIII A § 2(h)). Allowing homeowners to transfer their reduced assessment to another property can help address the perverse lock-in effect, but creates other problems: it essentially ensures that how long one has owned a home in the state – not one specific home, but any home – is a determining factor in how much one pays in property taxes, shifting even more of the burden onto newer entrants into the residential property market than a non-portable assessment limit (e.g., Cheung and Cunningham, 2011).

Assessment limits can increase risk leading to more mortgage distress. Bradley (2017) shows that when caps are lifted at time of sale, new homeowners may not realize that their property tax could be substantially higher than what has been assessed on the property previously. This surprise tax can lead to new homeowners dealing with financial stress and in extreme casuses defaulting on their mortgages. Bradley et al. (2023) price the risk

created by assessment limits. Their insight is that assessment limits make property taxes less pro-cyclical and that this can lead to increased risk and financial distress.

Moreover, assessment limits may reduce the supply of new homes. With or without portability, under an assessment limit regime, newly built homes will be taxed more heavily than the existing stock. Absent a portability regime, any newly constructed home will bear the full weight of a jurisdiction's property taxes, while they will be partially abated for any existing stock. Thus, new homes operate at a disadvantage, facing a disproportionate tax cost, the incidence of which will be borne by purchasers in the form of future property tax payments and homebuilders in the form of lower sale prices—the balance of incidence varying depending on elasticities in the local property market. If homebuilders bear a portion of the incidence, it is likely to reduce the supply of new homes, ultimately reducing both housing availability and affordability.

Finally, given that assessment limits typically reset upon sale, they are likely to cause much less capitalization than other methods of lowering property tax burdens. That said, capitalization can occur and thereby influence affordability. For instance, if the marginal homebuyer expects house price appreciation over their expected tenure, then assessment limits may capitalize to some extent. Portability of the limit would tend to increase the likelihood of at least some capitalization.

3.3. *Homestead Exemptions*

States can offer property tax benefits to owner-occupiers by taxing owner-occupied properties at different statutory rates (e.g., Vermont, West Virginia), applying differential assessment ratios to owner-occupied properties (e.g., South Carolina, Mississippi), or offering homestead exemptions. Homestead exemptions are an exclusion of a fixed amount of assessed value for tax purposes, and exceptionally generous exemptions – e.g., the $100,000 exemption recently adopted in Texas (Tex. Tax Code § 11.13), and $100,000 exemption seriously considered in Kansas (Loughead, 2024) – are generating growing interest among policymakers.

Among homeowners, homestead exemptions featuring a flat deduction amount are likely progressive, since the share of taxes abated is larger for homes with a lower assessed value (Rakow, 2024). Indeed, Ihlanfeldt and Rodgers (2022) show using data from the universe

of single-family homes in Florida that the homestead exemption undoes the statutory regressivity of the property tax, leading to an overall mildly progressive schedule.[16] McMillen and Singh (2024) estimate that the median U.S. municipality would need to allow a flat homestead exemption of approximately $25,000 to eliminate property tax regressivity.

When the relevant population is expanded to all households, however, the deduction appears much less progressive. If the deductions capitalize – likely in areas with inelastic housing supply because the marginal buyer is likely purchasing a home to reside in and therefore eligible for the homestead deduction – then it will fail to improve first-time buyer affordability. Moreover, assuming that property tax incidence shifts onto renters, the policy becomes even less progressive; even the owners of relatively modest homes are frequently better off than renters, who receive no such tax benefit. Moreover, if tax rates must ultimately be raised to make up for revenue lost due to the exemptions, then housing affordability will be further worsened for renters.

3.4. *Impact Fees and User Costs*

Impact fees and user fees form a class of alternatives to the traditional *ad valorem* property tax. Impact fees are a one-time levy on new property development typically earmarked towards funding specific infrastructure expansion projects: for example, the widening of a road leading into town to accommodate increased traffic. Local governments can collect impact fees at the time developers apply for a permit, at the point the development receives subdivision approval, or at multiple steps in the construction process. User fees are instead levied continuously against the property in proportion to services consumed by the owner. Common examples of services attached to user fees include: local public transportation systems, water treatment, maintenance of sewer systems, and public school administration.[17]

Rate schedules for both impact and user fees are typically set in a non-*ad valorem* fashion. Moreover, both types of property tax alternatives invoke the language of a

[16] Yet, the progressive aspects of homestead exemptions are partially undone by barriers to take-up, as homeowners are required to apply for the exemption (Ihlanfeldt, 2021).

[17] For an overview of user fees in a specific state, see the Gardner Policy Institute's "A Visual Guide to Tax Modernization in Utah Part Two: User Fees" https://d36oiwf74r1rap.cloudfront.net/wp-content/uploads/TaxMod-Aug2021-FInal.pdf.

Pigouvian tax by being set roughly in proportion to the expected strain on local public goods and services by new development or by an existing homeowner, as proxied by the square footage or other features of the property.[18] Infrastructure upgrades are a common objective underlying impact and user fees (Altshuler and Gomez-Ibanez, 1993).[19]

Impact fees have ambiguous effects on affordability. They have been demonstrated to deter construction of new housing units in some markets (Skidmore and Peddle, 1998, Been, 2005). And in some cases developers and/or subsequent landlords can pass through costs from impact fees to tenants in the form of higher rents. Pass through of these costs is stronger in supply-constrained areas where developers have *ex ante* market power. Conversely, by supporting new infrastructure, which often entails imposing greater impact fees, local governments may aid housing affordability on a quality-adjusted basis due to better provision of local goods and services (Burge, 2008).

Virtually all towns across the U.S. attach fees to permit applications, meaning that all towns have some form of impact fees. Because impact fees apply not just to new development but to construction on existing properties, they may crowd-out other profitable investment opportunities which in turn influence housing affordability. Bellon et al. (2024) find that binding liquidity constraints prevent homeowners from investing in green home renovations with positive externalities towards mitigating climate risks. Such home improvements can generate lower homeowners insurance premia, an increasingly prominent component of overall homeownership costs due to climate change (Keys and Mulder, 2024, Schuetz, 2024).[20]

By levying fees continuously rather than only at the point of development, user fees are arguably more in the spirit of a Pigouvian tax than impact fees which are based on forecasts of the developer's strain on local resources. Going back to Pigou (1932), per unit transaction

[18] Brueckner (1997) formalizes the notion of efficient impact fee regimes within the context of an urban growth model where such fees are used as a device to induce a sustainable migration path.

[19] For financing infrastructure projects, impact and user fees are close substitutes to tax increment financing (TIF) districts and special taxing districts, which allow the municipality to borrow against future property tax revenues (Luby and Moldogaziev, 2014).

[20] Annual insurance premia for homeowners policies in Florida tripled between 2018 and 2023, increasing annually by 42 percent in 2023 alone (Bloomberg, 2024a). Nationwide, homeowners insurance costs were up 21 percent in 2023 relative to 2022 (Bloomberg, 2024b).

taxes can eliminate externalities if the tax rate is correctly calibrated to equal the marginal damage created by an additional transaction. Therefore, user fees can also negatively affect housing affordability in instances where the local government over-estimates the marginal damage associated with any real negative externalities that the user fees are designed to eliminate (Gruber, 2015).

3.5. *Summary of Local Property Tax Reforms*

Reducing property taxes through rate cuts, limits, deductions, and impact fees and user fees will in certain instances and for certain groups increase housing affordability. However, it will often violate principles of a sound tax system (e.g., Musgrave and Musgrave, 1989, OECD, 2014), including neutrality and equity.

Of the mechanisms for lowering property taxes considered here, levy and rate limits suffer the least from these issues.They neither reward nor penalize new construction relative to existing homes or owner-occupied properties relative to rentals. Further, they do not distort the choice between moving and staying, or the decision on whether to renovate a home. Most fundamentally, they maintain the connection between property owners' tax liability and their relative assessed values and therefore maintain a form of horizontal neutrality and equity.

Even these tools, though, remain circumscribed in their ability to increase affordability. In areas where tax reductions capitalize into house prices and pass through into rents, introducing such limits or increasing them will fail to increase affordability for first-time homebuyers and renters and thus fail to increase affordability in an equitable manner.

Homestead exemptions and assessment limits also suffer from a failure to address affordability for renters and first-time buyers. Further, because they often cause a shifting of the tax burden, they are prone to worsening affordability for these groups. They also introduce considerable non-neutrality and distort housing choices. And assessment limits will further tend to suppress new housing supply, especially when coupled with homestead exemptions.

Relevant to all the relief measures, if property tax reductions are paired with cuts to public goods and these public goods are valued by residents, then any increase in affordability is, at best, narrow in scope and may produce welfare losses.

Finally, much of the preceding discussion assumes that tax reductions capitalize. However, in areas with very elastic housing supply, this will not be the case. The relief measures are relatively more favorable to new homebuyers in this instance. Along similar lines, if property tax changes pass through fully to rents, then some relief measures, such as rate or levy limits, will increase affordability for renters. In an important sense, though, these observations merely emphasize that the fundamental driver of a lack of housing affordability is regulation and other constraints which make housing supply very inelastic in large swathes of the country (e.g., Gyourko and Molloy, 2015, Glaeser and Gyourko, 2018, Molloy, 2020).

4. DATA

To provide empirical evidence on the links between property taxes and housing affordability, we combine several data sources to create a novel data set.

CoreLogic Owner Transfers. *Owner Transfers* is a transaction-level dataset that includes information on house prices, buyers' and sellers' identities, and details about the use (e.g., single vs. multi-family or new construction) and street address of the property. It also provides details on when properties are sold. We focus on arms-length transactions of single-family homes in our house price analysis.

CoreLogic Tax. To obtain observable property characteristics, such as location and physical structure (size, bedrooms, age, etc.), we merge CoreLogic *Owner Transfers* to CoreLogic *Tax*. CoreLogic *Tax* contains the tax assessment record for each property, its owner-occupied status, whether the homeowner claims a homestead exemption (when offered by a state or local authority), and a tax code area (TCA) variable that allows us to group batches of properties based on a common set of overlapping taxing jursidictions (Amornsiripanitch, 2023). For example, a TCA can consist of a set of houses located at the intersection of a tax assessor's neighborhood, a school district, and any non-*ad valorem* special taxing districts. Controlling for TCA fixed effects allows us to measure tax burdens on a quality-adjusted basis by holding fixed each residence's access to local public goods and services. We use a combination of *Owner Transfer* and *Tax* to examine the prevalence of binding assessment limits by comparing effective tax rates before vs. after a change of ownership through arms-length sale. The owner-occupied status flag further allows us to

distinguish between cases where counties implement assessment limits as extensions of homestead exemptions, as in Georgia.

CoreLogic Involuntary Liens. Many alternatives to property taxes such as user fees are set at a hyper-local level (cf. Section 3.4). Because of the labor involved in surveying multiple levels of local jurisdictions and harmonizing definitions across space, no comprehensive database of user fees and local tax initiatives exists. As a shortcut, we use CoreLogic *Involuntary Liens* to identify counties levying user fees. An observation in the Government Related Types file of *Involuntary Liens* represents an event triggered by either tax delinquency or court-ordered lien placed on an individual's assets.[21] We subset the data to local tax liens tied to service-based taxes and then code a county as relying on user fees if any delinquency lien exists over the years 2015 –2019.[22] Our use of *Involuntary Liens* complements the more limited geographic coverage of user fees in municipal balance sheet data (see below).[23] We merge *Involuntary Liens* to *Tax* to restrict attention to user fees for single-family homeowners.

CoreLogic Building Permits. We use the panel of permit applications in CoreLogic *Building Permits* to calculate fees levied on permits filed for new residential construction.[24] The *Building Permits* dataset tracks permit statuses from the time of application to the final status (e.g., approved or denied). We focus on information recorded at the time of application, including the filing fees and quoted project cost.

Supplementary, publicly available datasets. We use the Federal Housing Finance Agency's (FHFA) county-level house price indices to assess the effects of Georgia counties'

[21] See LaPoint (2023) and Bellon et al. (2024) for legal background on how liens are populated in the *Involuntary Liens* dataset.

[22] The default governmental unit in *Involuntary Liens* is a county, and therefore, we do not observe defaults on school taxes separate from property tax liens. Hence, our definition of a service-based tax lien is a lien placed for overdue fees on sewer maintenance, public utilities, sanitation, and water.

[23] We focus on the years 2015–2019 for computational tractability and to obtain a snapshot of the property tax landscape prior to the COVID-19 pandemic, which necessitated a recalibration of municipal budgets.

[24] This is a restrictive definition of impact fees in that, as discussed in Section 3.4, impact fees can be levied at both the point of permitting or at later stages in the construction process. Besides the fact that we are not aware of any other databases reporting construction-related fees (e.g., certificate of occupancy fees), since virtually all U.S. towns have a permit fee schedule, our definition allows for nationwide comparability of magnitudes.

assessment valuation freeze or cap policies on the broader housing market. Relative to the CoreLogic *Owner Transfers* data, the FHFA indices have the advantage of longer time coverage, allowing us to extend our sample back to the mid-1990s to establish a lack of differential pricing pre-trends across Georgia counties with and without assessment limits.

We merge in information on municipal balance sheets from the Government Finance Database provided by Willamette University. Pierson et al. (2015) discuss the construction of this database, which is a harmonized version of the raw historical files from the Census Annual Survey of State and Local Government Finances (ASSLGF). The ASSLGF provides a snapshot of municipal income sources and liabilities, including tax revenues, debt issuance, and remittances from higher or lower levels of government. To tabulate user fees, we restrict to a balanced panel of counties between the latest version of the survey starting from 2010, leading to a sample of 1,174 counties.

5. EMPIRICAL FINDINGS

5.1. *Atlas of Property Tax Metrics by State*

In order for property tax relief measures to influence affordability, they must change measured tax burdens. Thus, we begin with descriptive evidence on effective tax rates and their connection to relief policies.

Cross-sectional differences in effective tax rates. We use the CoreLogic data to measure how both the level and distribution of property tax burdens varies across states. This exercise captures the combined effect of complex state-level policies on effective property tax rates faced by homeowners. Given the popularity of state-level homestead exemptions and assessment limits, we focus our distributional analyses on differences in property tax burdens between owner-occupied and investment properties, as well as differences in tax burdens between new and existing homeowners.

Linking CoreLogic property tax and sales records allows us to measure effective property tax rates (ETRs) for nearly the universe of homes sold in the United States.[25] We define the ETR as the owner's annual tax bill as a percentage of the fair market value. We focus on measuring ETRs in the years immediately surrounding a sale because these are the years in

[25]The exception is 12 non-disclosure states, which do not require reporting of home sales prices. In these states, home sales prices are gathered from other public sources, such as the MLS, so data coverage is incomplete.

which the home's market value can be closely approximated by its sale price. We measure the prior owner's ETR from the property tax bill in the calendar year before the sale as a percent of the sale price. The new owner's ETR is the property tax bill in the calendar year after the sale as a percent of the sale price. The prior owner's ETR may differ substantially from the new owner's ETR if the sale triggered a significant reassessment of the property or if the new owner is eligible for different tax benefits than the prior owner. To approximate the average expected ETR on a property, we take the average of the prior owner's ETR and the new owner's ETR.

Overall tax rates. Figure 2 presents a heat map of average effective property tax rates at the state level. We calculate average ETRs among residential properties (single-family homes, duplexes, and condos) that sold in 2017 and 2018. Appendix Table III presents both mean and median ETRs by state. Effective tax rates are highest in most of New England and the Midwest, as well as Texas. In seven states – Connecticut, Illinois, New Hampshire, New Jersey, New York, Texas, and Vermont – property tax bills exceed 2 percent of market value for the average home in our sample. Effective tax rates are lower in the South and the West. Florida property tax bills average 1.2% of market value, and California tax bills average 1.0% of market value. In the lowest-tax states – Colorado, Hawaii, and Alabama – tax bills average less than 0.6% of market value.

Tax benefits for owner-occupiers. Figure 3 presents a heat map of tax benefits for owner-occupiers by state. The difference in tax rates between owner-occupied and investment properties is estimated from a regression of the effective tax rate in the year before a sale on an indicator for whether the home was owner-occupied in the year before the sale, controlling for the Census tract location of the home. Demeaning by Census tract accounts for variation in the overall level of property taxes and public services by geography within a state. Following Chinco and Mayer (2016), we proxy for owner-occupancy status by whether the owner lists their address as the property address (suggesting they occupy the property) vs. a secondary address (suggesting they do not occupy the property, generally because it is an investment property).[26] Appendix Table IV presents raw estimates of average property tax rates among owner-occupied properties and

[26]We describe properties that are not owner-occupied as investment properties. While most of these homes will be rentals, some are also second homes or vacant.

FIGURE 2.—Variation in Effective Property Tax Rates across States

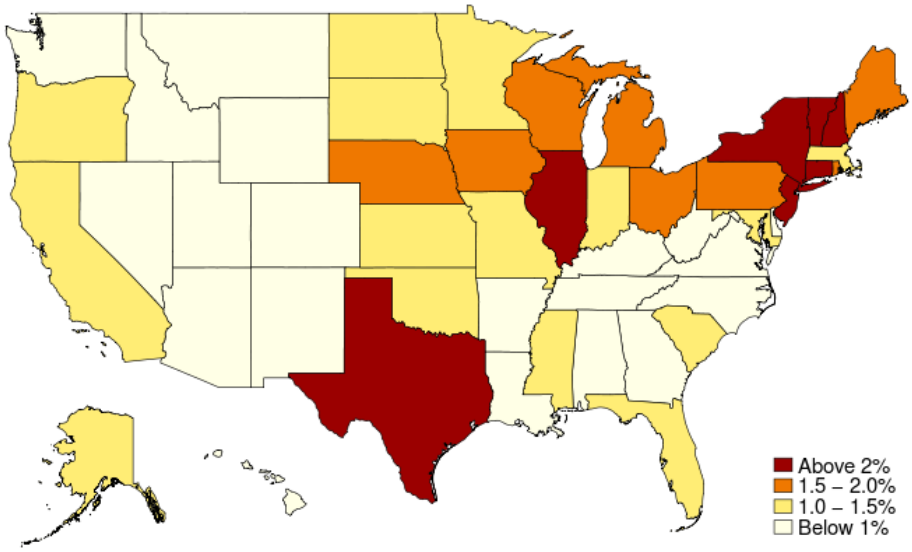


FIGURE 2.—The map displays for each state average effective property tax rates among homes that sold in 2017 and 2018. Effective tax rates are estimated from the average of the property tax bill in the year before the sale and the year after the sale as a percent of the sale price. The sample is restricted to arms-length transactions of residential properties (single-family homes, condos, and duplexes). Properties with unusually high or low sale prices (1st and 99th percentile of sale prices within their state) are excluded from the sample. Effective tax rates are winsorized at the 5th and 95th percentiles by state.

investment properties, as well as regression estimates of the difference in tax rates between owner-occupied and investment properties.

Michigan and Vermont offer owner-occupied properties the largest tax benefits relative to investment properties. In these states, effective tax rates on owner-occupied properties are half a percentage point lower than tax rates on investment properties within the same Census tract, in the year before a sale. Michigan exempts owner-occupiers from school taxes, while Vermont allows local jurisdictions to tax owner-occupied and rental properties at differential rates. Five other states – South Dakota, Indiana, West Virginia, South Carolina, and Mississippi – tax owner-occupied properties at rates at least 0.2% lower than rental properties, on average. West Virginia, Indiana, and South Dakota tax owner-occupied properties at different statutory rates than rental properties. South Carolina and Mississippi apply differential assessed values to owner-occupied and rental properties by statute.

FIGURE 3.—Difference in Effective Property Tax Rates between Owner-Occupied and Investment Homes

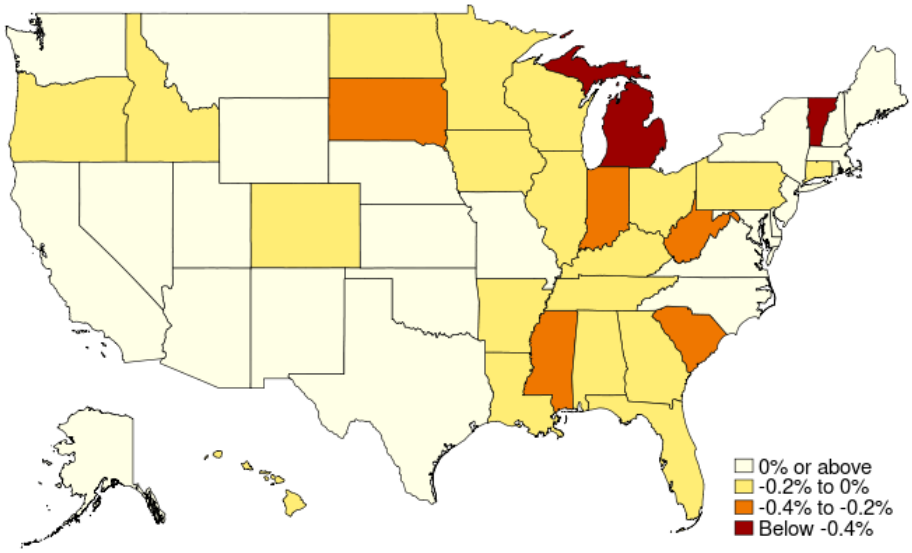


FIGURE 3.—The map characterizes states based on coefficients from a regression of effective property tax rates on an indicator for whether the home is owner-occupied in the year before a sale, controlling for the Census tract where the home is located. Negative values indicate that the state taxes owner-occupied homes at a lower average rate than other homes. Effective tax rates are measured from the property tax bill in the year before the sale, as a percent of the sale price. Owner-occupancy status is proxied from whether the owner sends the tax bill to the home (suggesting they occupy the property) vs. a secondary address (suggesting they do not occupy the property). The sample is restricted to arms-length transactions of residential properties (single-family homes, condos, and duplexes). Properties with unusually high or low sale prices (1st and 99th percentile of sale prices within their state) are excluded from the sample. Effective tax rates are winsorized at the 5th and 95th percentiles by state.

Assessment limits. Figure 4 captures how property tax burdens vary between new and existing homeowners. In states with binding assessment growth limits, the ETR on a property falls over the course of its owner's tenure, causing existing owners to face lower ETRs than new owners. We restrict this analysis to the ten states that reassess property values annually, to ensure that the new owner's assessment has been updated when their

FIGURE 4.—Graphical Evidence of Binding Assessment Limits from Effective Tax Rate Changes at Sale

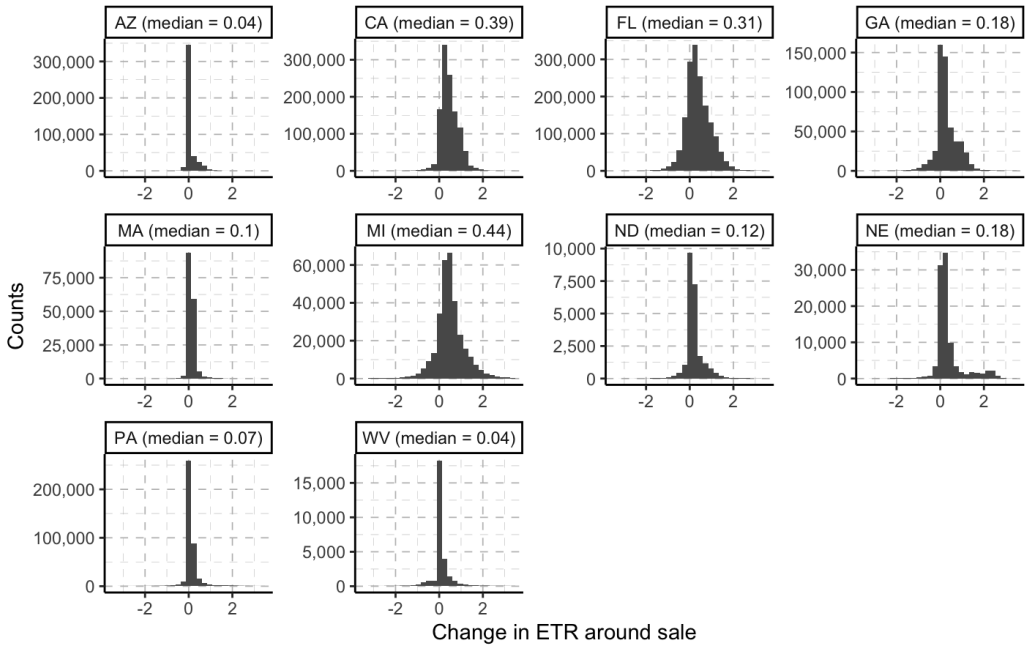


FIGURE 4.—Each panel of the figure plots the distribution for a given state of changes in effective property tax rates (ETRs), comparing the ETR paid one year prior to one year after an arms-length sale of a single-family home, duplex, or condo, according to equation (1). We also drop ETR observations for instances where the property flips within a year of the prior sale. The x-axis scale is in percentage points, and the y-axis denotes property counts. Our sample consists of transactions occurring between 2015–2019 in the 10 states for which assessor's offices revalue properties each year. We include Florida in this set of states because most properties' assessed values change year-on-year despite the state statutes only requiring revaluations at least once every five years. We drop extreme values of ΔETR with absolute value greater than 5 percentage points (i.e., the bottom and top 0.5th percentiles).

ETR is measured.[27] In particular, we measure the difference in ETRs as:

$$\Delta ETR_{i,[t-1,t+1]} = \frac{TaxBill_{i,t+1} - TaxBill_{i,t-1}}{SalePrice_{i,t}} \tag{1}$$

where we take the difference in tax bills associated with the same property i in a one-year window around the sale.

[27]Nine states reassess properties annually by statute. Florida requires assessors to revalue properties for taxes *at least* once every five years, but in practice Florida assessor's offices update their valuations on an annual basis. For a complete list of states' reassessment schedules and relevant statutes see Higginbottom (2010).

Figure 4 shows the distribution of ΔETR within each state. Of the nine states shown, California, Florida, Georgia, and Michigan offer some form of assessment limits. In these states, the median and standard deviation of ΔETR are notably higher than in the states without assessment limits. In states with generous assessment limits and strong home price appreciation, the ETR on a property falls substantially over the course of the owner's tenure, then resets upward when the home sells. This generates positive values of ΔETR for the average property. The magnitude of this effect varies between properties due to the length of the prior owner's tenure and the degree of home price appreciation during that tenure. This generates substantial cross-sectional variation in ΔETR across properties.

In states where assessment limits are particularly generous, there are upward as well as downward resets in ETRs, as evidenced by the masses in Figure 4 to the left of $\Delta ETR = 0$. Downward resets in ETRs reflect both the propensity for successful appeals and reductions in tax bills arising from policy measures enacted in the tax jurisdiction between $t-1$ and $t+1$. Upward resets result from combinations of long household tenures and strong housing price growth in a geographic market. We obtain nearly identical distributions of ΔETR for each state even after we net out average changes in ETRs at the tax code area (TCA) level to account for other local tax policy changes which might occur between the pre- and post-sale periods, pointing to the influence of tax appeals.

We use these tabulations to rank the states in terms of the generosity of their assessment limits. Michigan and California have the largest ΔETR for the median property. This makes intuitive sense. Michigan Proposition A (passed in 1994) limits assessed value increases to the CPI inflation rate, and California Proposition 13 (passed in 1978) limits assessed value increases to 2 percent annually. The median ΔETR in Florida and Georgia is slightly more muted. Florida offers assessment limits to owner-occupied properties but not investment properties, and resets in the ETR are limited by a portability provision through which homeowners with the exemption can transfer their accumulated cap to a new home up to an amount of $500,000. In Georgia, only one-fifth of counties offer complete assessment valuation freezes, a fact that we use to identify capitalization effects of property taxes in Section 5.2.

Homestead exemptions. In Figure 5, we further decompose the ETRs in Figure 4 by the homestead exemption status of the property being sold for the six states out of the ten with

FIGURE 5.—Effective Tax Rate Changes at Sale by Homestead Exemption Status

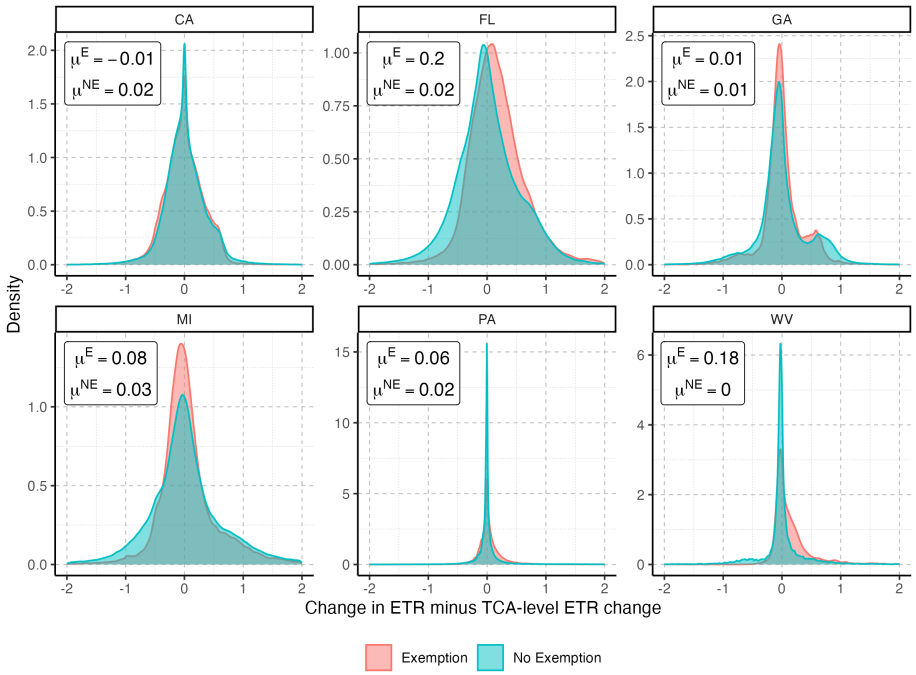


FIGURE 5.—Each panel in the figure displays the distribution of changes in effective tax rates by homestead exemption status for a given state. We net out average changes in ETRs at the tax code area (TCA)-year level to account for other local tax policy changes which might occur between the pre -and post-sale periods. We report the mean tax rate changes for homestead-exempt (μ^E) and non-exempt (μ^{NE}) properties. The x-axis scale is in percentage points, and the y-axis denotes property counts. In both panels, we apply the same property-level sampling restrictions as in Figure 4. Our sample consists of transactions occurring between 2015–2019 in the 6 states for which assessor's offices revalue properties each year and which offer homestead exemptions separate from other local property tax breaks. We drop extreme values of ΔETR with absolute value greater than 5 percentage points (i.e., the bottom and top 0.5th percentiles).

annual revaluation cycles which also offer standalone homestead exemptions. We demean by the average ΔETR within a TCA-year to account for the fact that the generosity of homestead exemptions available to owners can vary over time according to local ballot measures and school budgets. We code properties as exempt vs. non-exempt using the exemption status as of the year $t-1$ prior to a sale.

We uncover large differences across states in the generosity of the homestead exemption, as measured by resets in effective tax rates after the property turns over ownership, relative to average increments in ETRs in the same jurisdiction. With the exception of Georgia, the

differences in means between the two property types ($\mu^E - \mu^{NE}$) are statistically significant at the 1% level. The estimated difference-in-differences for ETRs is 0.18 p.p. for Florida and West Virginia, 0.05 p.p. for Michigan, and 0.04 p.p. for Pennsylvania. These resets in ETRs are economically meaningful; in Florida the average ETR during our sample period is 1.24 percent (cf. Appendix Table III), meaning that the average ETR resets upward by 15 percent after sale.[28] Counties in Florida and Georgia require the homestead exemption for obtaining an assessment limit or valuation freeze. However, in Georgia, valuation freezes are only available to homesteaders in 34 out of 159 counties. Indeed, if we subset to Georgia counties with valuation freezes, representing roughly half of the state's population, we calculate a mean difference in ETR reset of $\mu^E - \mu^{NE}$ = 0.02 p.p. (p-value = 0.000).

One issue with using changes in effective tax rates around a sale as a proxy for tax burdens is that the denominator of (1) may not reflect fair market value to the extent that homesteaders may face particular motivations for selling their property – such as elderly mobility needs or financial constraints – which means they are willing to accept lower prices to sell the home faster. Further, sellers who anticipate realizing greater capital gains upon sale, including homeowners with long tenures in the property, are willing to accept lower prices (Bracke and Tenreyro, 2021). We can measure how homestead exemptions reduce property tax burdens by instead computing changes in statutory tax rates (STRs):

$$\Delta STR_{i,[t-1,t+1]} = \frac{TaxBill_{i,t+1} - TaxBill_{i,t-1}}{AssessedValue_{i,t}} \tag{2}$$

The STR is defined with the same sampling and timing conventions as the ETR, but with the tax-assessed value in the denominator instead of the sale amount to address selection bias inherent in sale prices.

Appendix Figure A.9 shows that there is a clear upward reset in STRs for all states except for California after the sale of a previously homestead-exempt residence. The difference-in-differences estimate on the change in STRs is 0.34 p.p. in West Virginia, 0.33 p.p. in Florida, 0.25 p.p. in Georgia, and 0.22 p.p. in Michigan. In Pennsylvania, homestead exemptions are granted by only a select few counties, and so we observe more muted resets

[28] Except for Georgia, Kolmogorov-Smirnov tests allow us to reject the null of no difference between the distributions for exempt and non-exempt properties.

in STRs, just as we do for ETRs in that state. For all six states, the difference-in-differences estimates are statistically significant at the 1% level.

The California State Constitution offers all owner-occupiers who apply with their county assessor a $7,000 exemption. This is a small exemption relative to the one granted by the limits imposed by Proposition 13, which is estimated to reduce taxable values by nearly ten times as much in high cost of living parts of the state (Wasi and White, 2005), and likely by more in recent years given growth in housing price indices. Consequently, comparing homestead exempt to non-exempt properties in California is akin to comparing tax burdens for homeowners who find it worthwhile to apply for the exemption vs. those that do not. The relatively ungenerous homestead exemption means that we still fail to uncover any evidence of a tax break when we consider ΔSTR for exempt California properties in Figure A.9.

User fees. Figure 6 plots user fees as a fraction of county-level tax revenues since 2010 using the Census ASSLGF/Willamette Government Finance Database. User fees comprise a fairly constant, albeit modest, portion of municipal budgets, fluctuating between 3 to 4 percent of total tax revenues, or between 4 percent to 6 percent of property tax revenues. Because revenues collected through user fees are earmarked for the provision of local public goods and services, they are perhaps the most widely used residence-based alternative to *ad valorem* property taxes. Using the Corelogic Involuntary Liens data to identify user fees based on delinquency events, we find 67 percent of counties collect user fees, or contain smaller jurisdictions imposing user fees, over the period 2015 – 2019.

Impact fees. Figure 7 maps impact fees, as calculated from permit filing fees on new single-family home construction in the CoreLogic *Building Permits* data. Permit fees for new construction units can range from as low as $26 (in real 2015 USD) to over $40,000 in some parts of California. For the median county, fees amount to around 1 percent of forecasted project costs at the time of application. But in certain parts of Florida, the West Coast, and Southwestern U.S. fees can exceed 10 percent of project costs. Many of these counties are also among the weakest in terms of permitting activity for new single-family units and feature low housing supply elasticities according to regulatory indexes (Gyourko et al., 2008, 2021). These findings cast doubt on the hypothesis that impact fees are associated with greater local support for new development and point to a clear negative effect of impact fees on housing affordability for renters and homeowners.

FIGURE 6.—Importance of User Fees for County-Level Budgets

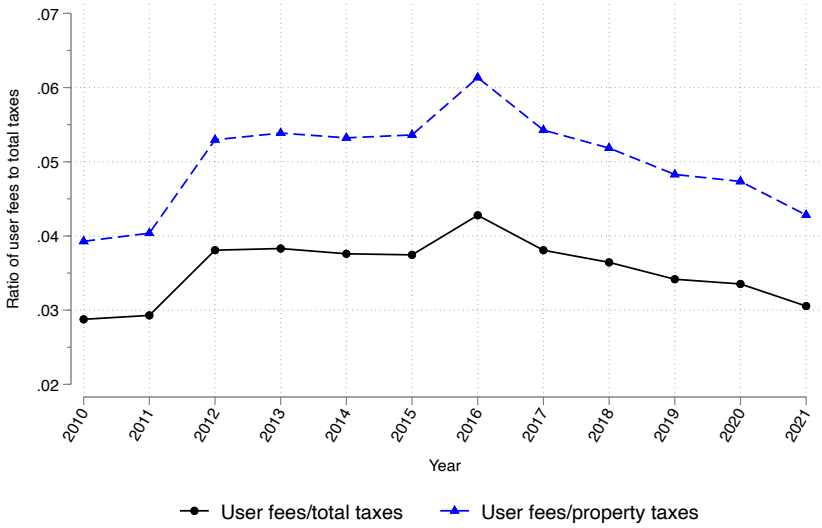


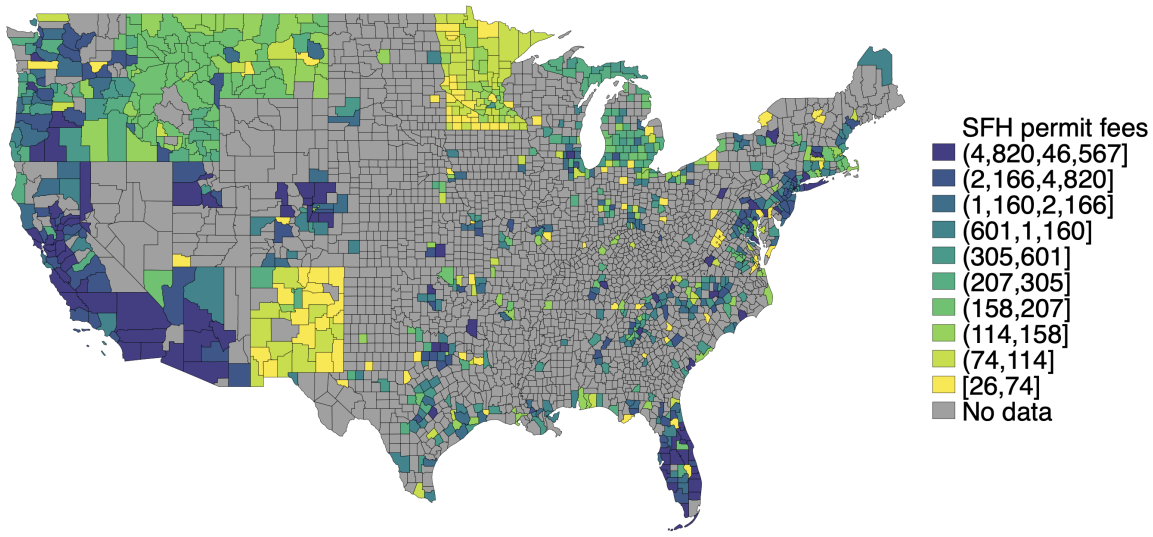
FIGURE 6.—The figure plots the ratio of total user fees to total tax revenues and the ratio of total user fees to total property tax revenues, summed across U.S. counties. We define user fees as the sum of the following line items: public utility taxes, local intergovernmental revenue (IGR) for interschool aid, other education expenses, highways, transit systems, and sewerage. Tabulations based on the Willamette University Government Finance Database, which harmonizes the raw historical files from the Census Annual Survey of State and Local Government Finances (ASSLGF). We restrict the sample time frame to 2010 – 2021 due to changes in 2010 to the survey methodology of the ASSLGF which render it difficult to compare line items over a longer time period. In computing user fees, we restrict to a balanced panel of 1,174 counties.

The maps in Figure 7 also make clear the limitations on our ability to measure impact fees using available data sources. Despite the fact that 29 states have legislation enabling local jurisdictions to levy impact fees (National Association of Home Builders, 2016), only 1,038 out of 3,244 counties record fees charged on permits during our sample period. Comparing permit fees to quoted costs also underestimates impact fees as a tax on new development to the extent that, (i) such fees can occur at both the beginning (permitting) and end (certificate of occupancy) stages of construction, and (ii) costs may exceed initial forecasts. More research and data collection is needed to improve measurement of impact fees along these dimensions.

Overall, we document substantial variation in effective tax burdens across states and that the tax relief measures we consider often meaningfully influence measured tax burdens.

FIGURE 7.—Impact Fees Levied on Construction of New Single-Family Units

A. Median Permitting Fees (Real 2015 USD)



B. Median Ratio of Permitting Fees to Quoted Project Costs

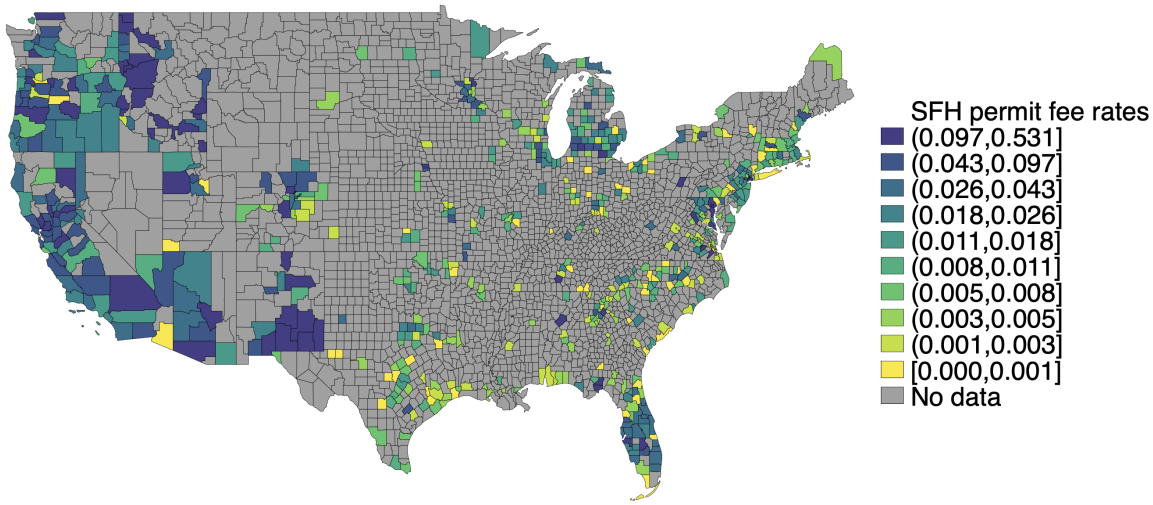


FIGURE 7.—The figure maps typical fees levied by counties for new single-family home (SFH) construction using the CoreLogic *Building Permits* data pooled over 2015 – 2019. Panel A splits counties into deciles based on median permitting fees imposed on permits filed for new single-family unit construction. We measure permitting fees in real 2015 dollars by deflating the permit fee recorded on the application filed with the town clerk's office by CPI-U. Panel B performs the same exercise but instead sorts counties into deciles based on the median ratio of permitting fees to the project cost as quoted on the application. We winsorize the numerator and denominator in each figure panel at the 1st and 99th percentiles.

While useful, this evidence provides an incomplete picture of the relation between property taxes and affordability because it fails to account for factors such as capitalization.

5.2. *Analysis of Georgia's Homestead Valuation Freezes*

We now turn to a natural experiment to provide evidence that is both causal in nature and which explicitly accounts for factors such as capitalization. We study the staggered passage of property tax assessment freezes extended to homeowners claiming the homestead exemption in Georgia. Between 1999 and 2008, 33 Georgia counties passed by ballot, and in a quasi-randomly timed fashion, local statutes either freezing tax-assessed values at a base year or capping any assessment value increase at a statutory inflation rate indexed to recent annual house price growth.[29]

We classify all 159 Georgia counties by their current policies surrounding assessment limits. The location of the counties with assessment limits is mapped in Appendix Figure A.10. Of the 34 counties with a freeze currently in place, 27 offer a "full" freeze without age restrictions, meaning that the assessed value is frozen as of a base year. For incumbent homeowners with a homestead exemption in place, the base year used for valuation is the year prior to the formal ordinance implementing the freeze; for homeowners who obtain the exemption after the law's passage in some year t, the base year is $t-1$. Two counties offer a full valuation freeze, but only to homestead-exempt owners over age 65 ("senior"). Four counties and Atlanta cap any year-on-year increase in assessed values at some statutory rate equal to either 3 percent or the prevailing rate of CPI inflation, whichever is lower.

What types of counties adopt such policies? Table I compares Georgia counties with and without a valuation freeze on the basis of their demographics and financial health from 2000, the first year in which a freeze was activated.[30] Counties appear statistically similar in terms of their homeownership rates, debt-to-income ratios, and their reliance on property taxes as a revenue source. Counties that enacted freezes had slightly fewer householders over the age of 65, fewer non-white householders, and leaned slightly more

[29] One Georgia county, Muskogee County, passed a homestead exemption freeze in 1982, which predates our sample time period.

[30] We use the 2000 Census to assess balance on *ex ante* observables since that is the first year when detailed income and demographic variables are available at the county level.

TABLE I

SUMMARY STATISTICS: GEORGIA COUNTIES BY VALUATION FREEZE STATUS

	Did not enact valuation freeze			Enacted valuation freeze			
Variable	N	Mean	SD	N	Mean	SD	F-Test
Households, 2000	125	10,964	13,483	33	47,455	79,848	F= 23.936^{***}
Homeownership rate, 2000	125	0.74	0.081	33	0.74	0.095	F= 0.145
Share with white non-hispanic householder, 2000	125	0.7	0.16	33	0.78	0.16	F= 6.798^{**}
Share with householder age 65+, 2000	125	0.22	0.047	33	0.19	0.067	F= 10.231^{***}
Republican presidential vote share, 2000	125	0.57	0.1	33	0.61	0.11	F= 3.906^{**}
Median household income, 2000	125	32,757	8,096	33	41,398	10,899	F= 25.497^{***}
Growth in median household income, 2000-2010	125	0.17	0.12	33	0.16	0.083	F= 0.019
Growth in number of households, 2000-2010	125	0.13	0.15	33	0.25	0.18	F= 14.848^{***}
Ratio of debt to total revenue, 2000	123	0.51	1.3	33	0.49	1	F= 0.004
Ratio of property taxes to total revenue, 2000	123	0.34	0.11	33	0.31	0.07	F= 2.972^{*}

Notes: Household income and demographic data are from 2000 Census summary tables, 2010 Census summary tables, and 2005-2010 American Community Survey (ACS) estimates. Electoral data are from the MIT Election and Data Science Lab. Statistical significance markers: $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$

Republican. Further, counties with a freeze had almost four times as many households and 25 percent higher income as of 2000. Counties with a freeze saw similar income growth but faster population growth in the period between 2000 and 2010, when most exemptions were enacted. These descriptive statistics underscore the need to account for the urban-rural divide in selection into instituting more generous property tax breaks to owner-occupiers.

We test for capitalization effects using a standard difference-in-differences research design. Our identifying assumption is that house prices would have evolved similarly across counties in the absence of any differential exemption freeze policies. We propose the following standard event study specification:

$$\log(P_{c,t}) = \sum_{t=-n, t\neq -1}^{+m} \beta_t \cdot \textit{Freeze}_{c,t} + \gamma' \cdot \mathbf{X}_{c,t-1} + \alpha_c + \delta_t + \varepsilon_{c,t} \tag{3}$$

where $P_{c,t}$ is the house price index level for county c observed in year t. α_c and δ_t refer to county and year fixed effects, respectively. $Freeze_{c,t}$ is a dummy equal to unity if the

county has an active homestead exemption freeze policy as of year t. We use the passage date to code the cutoff year determining treatment.[31]

One attractive feature of our setting is that Georgia reassesses properties on an annual basis. Unlike in other states, this means we do not have to contend with the possibility that counties' timed their freeze policies depending on the number of years until the next revaluation cycle. A town might wait until a revaluation year to enact a freeze to lock in a higher base year valuation, creating mechanical, but potentially non-random, variation in the timing of local policy changes related to assessor's calendars. This is not a concern in Georgia.

Under our identifying assumption, the dynamic coefficients β_t in equation (3) capture how housing market conditions vary over time in response to granting homeowners lower ETRs by fixing or capping assessed values. To address some of the differences between treatment and control counties highlighted in Table I, we include in the vector of controls $\mathbf{X}_{c,t-1}$ expenditure growth and lagged debt-to-income or interest coverage, and property tax-to-revenue ratios. There is also clear spatial clustering in Figure A.10, where pockets of counties neighboring Atlanta, Savannah, and the northern border of the state all currently have freezes in place. Spatial clustering could be due to interjurisdictional competition (Wilson, 1986) or yardstick competition (Revelli and Tovmo, 2007). The former case would be one where counties pass freezes in response to neighboring counties doing the same in order to preserve tax revenues by preventing prospective residents from moving across the border to reap the benefits of lower property tax rates.

Yardstick competition, by contrast, could occur if counties compete not over tax revenues but over apportionment funds received from the state government in exchange for offering tax breaks. Yardsticking is enabled by state rebates to counties for offering more generous homestead deductions. Counties could claim such rebates from the state government under the Homeowner's Tax Relief Grant (HTRG) program, active during the same 1999 – 2008 period over which counties decided to enact valuation freezes.[32]

[31] Note that the tax year in Georgia follows the calendar year.

[32] Brien and Sjoquist (2014) find that roughly one-third of the funds transferred to Georgia counties under the HTRG were ultimately used to bolster revenues rather than provide additional tax relief.

Without taking a stance on which underlying form of competition could give rise to strategic complementarities in local governments' decisions to offer property tax breaks to owner-occupied residents, we present robustness checks which account for these potential sources of non-random timing by including a dummy $\mathbb{1}\{N_{c,t} > 0\}$ indicating whether a neighboring county to county c has passed their own freeze as of year t. If homestead exemption freezes are capitalized into market home prices, our estimated $\widehat{\beta}_t$ without controlling for $\mathbb{1}\{N_{c,t} > 0\}$ should exhibit a hump shape; prices should increase immediately after freeze adoption and then revert to zero as more neighboring counties pass freezes, reducing the desirability of living in any individual county located in the cluster.[33]

Interpreting the β_t as the causal effects of the homestead valuation freeze policy is complicated by the fact that the composition of counties in the treatment and control groups shifts over time. The β_t in equation (3) are identified off the entry of new counties with freeze policies. This is useful for identification since it means that within each time period we only require counties with newly adopted freezes to be selected as if at random. However, staggered entry gives rise to the "negative weights" problem for aggregating average treatment effects across treatment cohorts (Goodman-Bacon, 2021).

To check robustness to treatment cohort heterogeneity, we use the Sun and Abraham (2021) estimator, comparing never-treated counties without a valuation freeze to those with a valuation freeze.[34] Figure 8 plots the dynamic estimates $\widehat{\beta}_t$ from estimating specification (3) by OLS vs. the Sun and Abraham (2021) estimator. The coefficients are almost identical across the two specifications, indicating that estimated average treatment effects on the treated (ATT) are relatively constant across different waves of valuation freezes. In the third specification, we apply the Sun and Abraham (2021) estimator but subset to urban

[33] Consistent with this notion, if we instead control for dummies of the cumulative number of neighboring counties who have adopted a freeze to date, our estimates attenuate but exhibit a smoother dynamic path.

[34] For the dynamic county-level analysis we use the Sun and Abraham (2021) estimator instead of alternative estimators (e.g., Callaway and Sant'Anna, 2021, Borusyak et al., 2024) which use the not-yet-treated group of counties as a control group because the latter would suffer from power issues with only 35 treated jurisdictions in our setting. The Callaway and Sant'Anna (2021) estimator with never-treated units as the control group yields identical results as Sun and Abraham (2021) when estimating versions of (3) without covariates.

counties, defined as those with above-median 2000 Census population, or with at least 25,000 people.[35]

FIGURE 8.—Event Study Analysis of GA Homestead Exemption Valuation Limits on House Prices

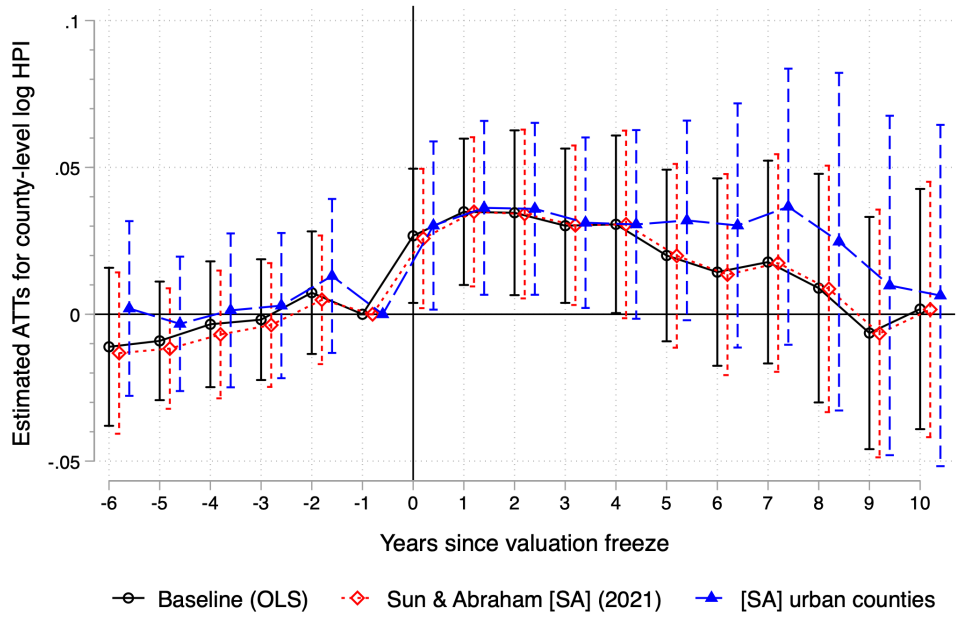


FIGURE 8.—The figure plots the event study coefficients from estimating equation (3) via OLS and the Sun and Abraham (2021) estimator. In the third specification we apply the Sun and Abraham (2021) estimator but subset to urban counties, defined as those with a 2000 Census population above the median for Georgia counties. The outcome in each regression is the log county-level house price index (HPI) level. We use the annual county-level index from the FHFA which pools transactions involving both for-purchase mortgages and refinancing loans. Error bars indicate 95% confidence intervals obtained from clustering standard errors at the county level.

County-level house prices increase by 2.6 percent in the same year a county passes an exemption. For both estimators, there is no evidence of differential pre-trends in the lead up to a reform, supporting our identifying assumption. In keeping with the interjurisdictional competition hypothesis, ATTs evolve in a hump-shaped fashion, peaking in the year after

[35]The dynamic path of prices follows a similar shape, but with more imprecisely estimated coefficients, when we define an urban county as one with greater than 50,000 people. This alternative definition follows the Census definition of an Urbanized Area. Still, even under this more selective definition, we find a bump in house prices of roughly 2.5 percent that is significant at the 10% level.

TABLE II

POOLED DIFFERENCE-IN-DIFFERENCES ESTIMATES: CAPITALIZATION OF GEORGIA HOMESTEAD VALUATION FREEZES INTO HOUSE PRICES

Outcome: $\log(P_{c,t})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Freeze_{c,t}$	0.069^{***}	0.026^{*}	0.070^{***}	0.026^{*}	0.032^{**}	0.040^{**}	0.056^{**}	0.071^{**}
	(0.021)	(0.014)	(0.021)	(0.015)	(0.015)	(0.017)	(0.022)	(0.033)
$\Delta N_{c,t}$			✓	✓				
$\mathbb{1}\{N_{c,t} > 0\}$					✓	✓	✓	✓
Balance sheet controls							✓	✓
Estimator	OLS	CSDID	OLS	CSDID	OLS	CSDID	OLS	CSDID
N	4,501	4,472	4,362	4,233	4,501	4,231	2,068	1,595
# Counties	139	139	139	139	139	139	113	113

Notes: The table presents estimated average treatment effects on the treated (ATT) from estimating static (pooled) versions of (3). The outcome in each column is the log house price index (HPI) level for Georgia counties. We estimate ATTs in odd columns via OLS, and in even columns apply the CSDID estimator of Callaway and Sant'Anna (2021) using never-treated counties as the control group. In some specifications we control for strategic complementarities in counties' decisions to adopt homestead valuation freeze policies, parameterized as either the change between years in the number of neighboring counties with a freeze ($\Delta N_{c,t}$), or as a dummy for whether there are any neighboring counties with a freeze to date ($\mathbb{1}\{N_{c,t} > 0\}$). The final two columns condition on a vector of controls constructed from the Willamette Government Finance Database, including annual expenditure growth, and lagged debt-to-revenue, user fees-to-revenue, and property tax-to-revenue ratios. In all specifications, we cluster standard errors by county. Standard errors on the CSDID estimator obtained via wild bootstrap with 999 replication draws. Statistical significance markers: $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$

freeze passage at 3.5 percent and then decaying towards zero within nine years after passage. The capitalization effect is more persistent in urban counties, with the point estimates remaining stable until nine years after the reform.

We present static versions of our regression equation (3) in Table II. In this table, we report average treatment effects on the treated (ATTs) obtained from OLS and the pooled CSDID estimator of Callaway and Sant'Anna (2021). We find a robust capitalization effect of homestead exemption freezes into house prices, even after accounting for neighboring counties' decisions to adopt their own freezes and variation in municipal balance sheet characteristics. (These controls were not included in the dynamic specification presented above.) While the year-to-year change in the number of neighbors with freezes, $\Delta N_{c,t}$,

does not attenuate the treatment effects, the OLS estimates decline by over one-half after conditioning on having any county neighbor with a freeze to date, represented by $\mathbb{1}\{N_{c,t} > 0\}$. The effects are slightly stronger in our preferred specifications in the final two columns in which we account for strategic complementarities in tax-setting policy, counties' indebtedness, and reliance on the property tax for revenue. Our capitalization estimates range from 2.6 percent to 7.4 percent.

Do our estimates of the capitalization effect of the homestead valuation freeze reflect decisions on the margin of homeownership? To answer this question, we calculate households' implied discount rate such that the change in the price of the house is set equal to the change in the present discounted value of cost savings from lower property taxes plus gains from full capitalization of the homestead exemption into the ultimate sale price. We require two numbers: the average tenure among Georgia homeowners and the average reduction in property taxes resulting from the freeze. We find an average tenure of 12 years among Georgia single-family homesteaders with mortgages in the CoreLogic data. Calculating the expected reduction in property tax savings requires us to take a stance on how households form price expectations. As a benchmark, we assume that households form rational expectations about the growth in future home values by forecasting house price growth consistent with historical averages of roughly 3 percent. These calculations result in an implied annual discount rate of 2.8 percent for our low-end estimate in Table II, and a discount rate of 2.4 percent at the high end of our difference-in-differences estimates.[36] Our capitalization estimates thus result in discount rates within the range of those reported in the real estate literature for medium-run investment horizons (Giglio et al., 2015, 2021).

Assessment limits are less likely to capitalize than other relief measures because they provide a benefit to the purchasing homeowner only in the future and assuming the house appreicates in value. Thus, the capitalization of this form of tax relief highlights the importance of capitalization in understanding the connection between property taxes and housing affordability. These results also emphasize that such policies are often unhelpful or

[36]This calculation assumes that the distribution of household tenures is static over time. This may not be the case to the extent that household mobility has increased in recent years due to shifting demographics and the advent of work-from-home norms (Barrero et al., 2023). We therefore likely under-estimate the discount rate.

counterproductive for new homeowner affordability. With capitalization, new owners must finance a more expensive house, but in the initial years of ownership receive no benefit.

6. CONCLUSION

The political appeal of property tax relief is readily apparent, and reducing property taxes will in certain instances, and for certain groups, increase housing affordability. The results of this paper make clear that policymakers must remain attuned to the complex economic ramifications of these choices, which may sometimes run counter to their policy aims of increasing affordability for those most on the margins of current homeownership or prospective homeownership for renters.

Furthermore, our study emphasizes the ongoing importance of research at the intersection of property taxes and housing affordability. Several areas warrant future investigation. Firstly, more empirical evidence on residential investment is crucial for understanding its long-term implications. Previous studies suggest that reduced property taxes can stimulate residential investment, potentially bolstering housing supply and affordability (Lutz, 2015) and shift consumption of structures and land (England, 2016). Secondly, there is a need for further research on the spatial distribution of housing, as existing literature presents conflicting findings regarding the impact of property taxes on urban sprawl and density (Song and Zenou, 2009, Wassmer, 2016).

Moreover, the property tax operates within a broader tax system, necessitating consideration alongside other state and local taxes. Although property taxes are valued for their transparency, stability across business cycles, links to public goods provision, and economic efficiency, reducing them might necessitate higher income taxes or alternative tax structures, which could influence housing prices and affordability dynamics (Gyourko and Tracy, 1991, Youngman, 2016, Seegert, 2016). Alternatively, split-rate property or land taxes might serve as effective policy tools (Murphy and Seegert, 2023).

Lastly, while current research predominantly examines supply elasticities, understanding demand elasticities is equally vital. Varied findings on rent responsiveness to housing supply expansions underscore the need for deeper exploration into how new construction impacts amenities and rental prices (Diamond and McQuade, 2019, Anenberg and Kung, 2020, Pennington, 2021, Asquith et al., 2023, Eriksen and Yang, 2024). Resolving these

discrepancies will enhance our understanding of housing market dynamics and inform effective policy interventions.

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APPENDIX

FIGURE A.9.—Statutory Tax Rate Changes at Sale by Homestead Exemption Status

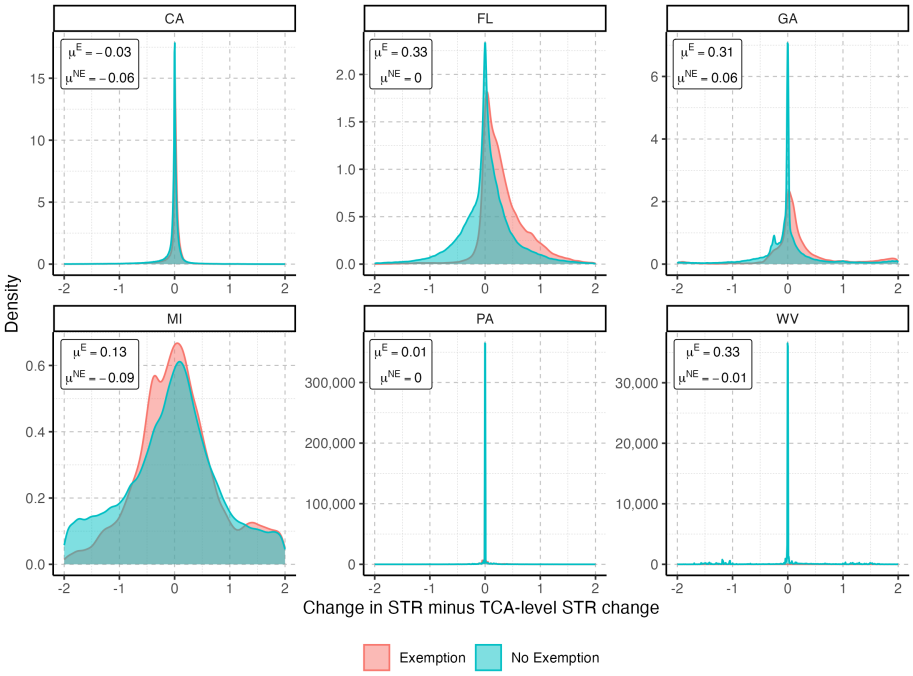

FIGURE A.9.—Each panel in the figure displays the distribution for a given state of changes in effective tax rates by homestead exemption status. We net out average changes in STRs at the tax code area (TCA)-year level to account for other local tax policy changes which might occur between the pre -and post-sale periods. We report the mean tax rate changes for homestead-exempt (μ^E) and non-exempt (μ^{NE}) properties. The x-axis scale is in percentage points, and the y-axis denotes property counts. In both panels, we apply the same property-level sampling restrictions as in Figure 4. Our sample consists of transactions occurring between 2015–2019 in the 6 states for which assessor's offices revalue properties each year and which offer homestead exemptions separate from other local property tax breaks. We drop extreme values of ΔSTR with absolute value greater than 5 percentage points (i.e., the bottom and top 0.5th percentiles).

FIGURE A.10.—Map of Georgia Counties by Status of Homestead Exemption Valuation Limits

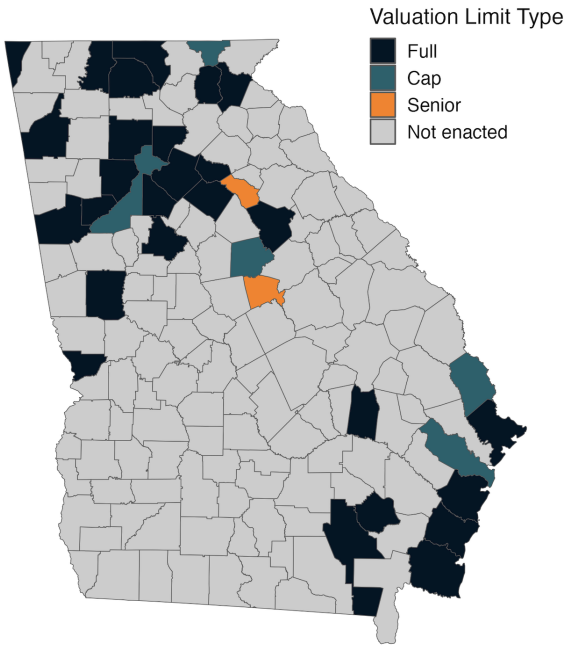

FIGURE A.10.—The figure provides a map of Georgia counties that have adopted homestead exemption valuation freezes or limits as of May 2024. We classify counties into three categories: “Full" if the valuation is frozen as of a base year – which by default is the year prior to the formal ordinance implementing the freeze or year prior to the homeowner being approved for the homestead exemption, whichever is later; “Cap" if the county has adopted a homestead exemption valuation cap on year-over-year increases in assessed values at some statutory rate equal to either 3 percent or CPI inflation rate, whichever is lower; “Senior" refers to cases where the county offers a full valuation freeze but only to residents over age 65. We obtained record of each county’s property tax ballot measures from the Georgia Department of Revenue (https://dor.georgia.gov). For counties without a ballot measure on file we contacted the relevant tax assessor’s office to confirm the passage date and criteria underlying any exemption valuation limits currently in place.

TABLE A.III

EFFECTIVE PROPERTY TAX RATES BY STATE

	Mean	Median
Alabama	0.55%	0.48%
Alaska	1.20%	1.22%
Arizona	0.64%	0.61%
Arkansas	0.77%	0.74%
California	1.03%	1.02%
Colorado	0.55%	0.52%
Connecticut	2.23%	2.13%
Delaware	0.62%	0.56%
District of Columbia	0.66%	0.67%
Florida	1.24%	1.20%
Georgia	0.99%	0.99%
Hawaii	0.4%	0.37%
Idaho	0.85%	0.78%
Illinois	2.39%	2.33%
Indiana	1.09%	0.97%
Iowa	1.82%	1.78%
Kansas	1.44%	1.38%
Kentucky	0.99%	0.97%
Louisiana	0.97%	0.96%
Maine	1.50%	1.42%
Maryland	1.17%	1.09%
Massachusetts	1.23%	1.21%
Michigan	1.77%	1.66%
Minnesota	1.12%	1.11%
Mississippi	1.05%	0.89%
Missouri	1.16%	1.16%
Montana	0.92%	0.89%
Nebraska	1.73%	1.73%
Nevada	0.61%	0.61%
New Hampshire	2.15%	2.06%
New Jersey	2.50%	2.35%
New Mexico	0.91%	0.87%
New York	2.18%	2.00%
North Carolina	0.86%	0.84%
North Dakota	1.21%	1.18%
Ohio	1.80%	1.70%
Oklahoma	1.07%	1.09%
Oregon	1.04%	1.03%
Pennsylvania	1.96%	1.79%
Rhode Island	1.69%	1.65%
South Carolina	1.01%	0.87%
South Dakota	1.34%	1.26%
Tennessee	0.71%	0.64%
Texas	2.15%	2.14%
Utah	0.61%	0.60%
Vermont	2.59%	2.11%
Virginia	0.95%	0.98%
Washington	0.89%	0.88%
West Virginia	0.81%	0.68%
Wisconsin	1.90%	1.85%
Wyoming	0.60%	0.59%

Note: Effective tax rates are estimated from homes that sold in 2017 and 2018. Effective tax rates are estimated from the average of the property tax bill in the year before the sale and the year after the sale as a percent of the sale price. The sample is restricted to arms-length transactions of residential properties (single-family homes, condos, and duplexes). Properties with unusually high or low sale prices (1st and 99th percentile of sale prices within their state) are excluded from the sample. We winsorize effective tax rates at the 5th and 95th percentiles by state.

TABLE A.IV

AVERAGE EFFECTIVE TAX RATES IN YEAR BEFORE SALE, BY OWNER-OCCUPANCY

	Owner-occupied properties	Investment properties	Difference between owner-occupied and investment properties, controlling for Census tract
Alabama	0.49%	0.58%	-0.10%
Alaska	1.20%	1.10%	0.00%
Arizona	0.61%	0.54%	0.05%
Arkansas	0.69%	0.78%	-0.13%
California	0.81%	0.79%	0.03%
Colorado	0.46%	0.44%	-0.03%
Connecticut	2.23%	2.23%	-0.02%
Delaware	0.63%	0.45%	0.02%
District of Columbia	0.59%	0.67%	-0.09%
Florida	1.00%	1.11%	-0.11%
Georgia	0.84%	0.87%	-0.03%
Hawaii	0.31%	0.52%	-0.18%
Idaho	0.78%	0.81%	-0.06%
Illinois	2.22%	2.36%	-0.08%
Indiana	0.92%	1.38%	-0.40%
Iowa	1.73%	1.79%	-0.05%
Kansas	1.31%	1.23%	0.08%
Kentucky	0.86%	0.86%	-0.05%
Louisiana	0.86%	0.90%	-0.06%
Maine	1.48%	1.39%	0.04%
Maryland	1.12%	1.04%	0.07%
Massachusetts	1.21%	1.10%	0.04%
Michigan	1.39%	1.91%	-0.57%
Minnesota	1.07%	1.10%	-0.06%
Mississippi	0.90%	1.30%	-0.36%
Missouri	1.10%	1.09%	0.00%
Montana	0.85%	0.79%	0.00%
Nebraska	1.56%	1.42%	0.07%
Nevada	0.67%	0.53%	0.11%
New Hampshire	2.10%	1.99%	0.04%
New Jersey	2.46%	2.41%	0.00%
New Mexico	0.83%	0.74%	0.02%
New York	2.13%	2.26%	0.00%
North Carolina	0.82%	0.76%	0.00%
North Dakota	1.14%	1.10%	-0.06%
Ohio	1.71%	1.77%	-0.11%
Oklahoma	0.97%	0.89%	0.05%
Oregon	0.97%	0.97%	-0.03%
Pennsylvania	1.89%	2.00%	-0.05%
Rhode Island	1.65%	1.60%	0.00%
South Carolina	0.74%	1.03%	-0.26%
South Dakota	1.25%	1.49%	-0.23%
Tennessee	0.64%	0.66%	-0.01%
Texas	1.93%	1.73%	0.12%
Utah	0.55%	0.54%	0.01%
Vermont	2.33%	2.83%	-0.50%
Virginia	0.92%	0.87%	0.01%
Washington	0.84%	0.80%	0.03%
West Virginia	0.68%	0.99%	-0.30%
Wisconsin	1.87%	1.96%	-0.15%
Wyoming	0.59%	0.56%	0.02%

Note: The difference between owner-occupied and investment properties column displays coefficients from a regression of effective property tax rates on a dummy for whether the home is owner-occupied in the year before a sale, controlling for the Census tract where the home is located. Negative values indicate that the state taxes owner-occupied homes at a lower average rate than other homes. Effective tax rates are measured from the property tax bill in the year before the sale, as a percent of the sale price. Owner-occupancy status is proxied from whether the owner sends the tax bill to the home (suggesting they occupy the home) or a secondary address (suggesting they do not occupy the home). We refer to homes that are not owner-occupied as investment properties - this includes rentals, second homes, and vacant homes. The sample is restricted to arms-length transactions of residential properties (single-family homes, condos, and duplexes). Properties with unusually high or low sale prices (1st and 99th percentile of sale prices within their state) are excluded from the sample. We winsorize effective tax rates at the 5th and 95th percentiles by state.